

REMARKS/ARGUMENTS

Changes:

The claims have been amended to better describe the types of bias on the first and second check valves and the position of the outlet port.

No new matter has been added.

The First Rejection Under 35 U.S.C. § 103 – Obviousness.

Claims 1-6, 8-15 and 17-19 have been rejected by the United States Patent and Trademark Office under 35 U.S.C. § 103(a) as being unpatentable over the pre-grant publication 2003/0121654 to Carlin in view of U.S. Patent No. 3,473,611 to Gregston and U.S. Patent No. 4,063,594 to Canterbury.

35 U.S.C. 132 Rationale.

In the opinion of the United States Patent and Trademark Office, the base reference, the Carlin '654 pre-grant publication, discloses (Figures 2-5) a downhole injection valve assembly for controlling the downhole insertion of a chemical into a well through capillary tubing. The downhole injection valve assembly has an elongated tubular housing including an inlet end and an outlet end. The elongated tubular housing can be attached to the capillary tubing at the inlet end. There is a mechanically biased check valve positioned within the housing at the outlet end to prevent the entry of gas, fluids or solids from said well bore into the interior portion of said elongated tubular housing.

Further, in the opinion of the United States Patent and Trademark Office, the Carlin '654 pre-grant publication is lacking in several respects. Specifically, it does not disclose that there is a chemical reservoir or that the chemical is pumped down using a chemical pump. Still further,

the Carlin '654 pre-grant publication does not disclose that there are two ball check valves in series within the tubing or that the amount of bias on said first adjustable mechanically biased check valve is determined by the characteristics of said well, the chemical being inserted into the well, and the characteristics of the system for causing the chemical to flow through the capillary tubing. The Carlin '654 pre-grant publication also does not disclose that the first ball check valves bias is adjustable through the amount of compression on a spring imparted by the spring carrier.

To supply the foregoing listed deficiencies in the primary reference, the Carlin '654 pre-grant publication, the United States Patent Office uses the Gregston '611 reference. Specifically, it is indicated that the Gregston '611 reference discloses (Fig. 2) a chemical injector that is fed by a reservoir that feeds into an elongated tubing using a chemical pump. The elongated tubing has multiple ball and seat check valves in series. The conclusion is then drawn that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the pump, reservoir and check valve configuration taught by the Gregston '611 reference on the apparatus disclosed in the Carlin '654 pre-grant publication. This combination would be done for a variety of reasons. First, the pump and reservoir would be used because this is typical in the well bore art of chemical injection to use a pump and reservoir. Second, the series check valves would be used because it [sic] provides a redundancy within the system so that no fluid is allowed passed [sic] the first (check valve) if the second (check valve) should fail.

The United States Patent and Trademark Office then adds the teachings of the Canterbury '594 reference to the combination of the Carlin '654 pre-grant publication and the Gregston '611 reference. Specifically, it is indicated that the Canterbury '594 reference discloses (Fig. 1) a

check valve in which a number of variables (Col. 2, Line 61 to Col. 3, Line 16) are used to determine the adjustability of the check valve member and that bias of the valve is adjusted accordingly. The bias of the spring (13) in the check valve is adjusted by moving the spring seat (15). The conclusion is then drawn that it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the ball and seat valves as disclosed by the Carlin '654 pre-grant publication in view of the Gregston '611 reference adjustable by adjusting the bias as shown by the Canterbury '594 reference. The motivation as indicated by the United States Patent and Trademark Office would be that greater control of the check valve could be maintained according to different variables of the well.

Response to the First Rejection:

To provide a basis for the rejection for Claims 1-6, 8-15 and 17-19, the Carlin '654 pre-grant publication is used as a base reference upon which the teachings of the Gregston '611 reference and the Canterbury '594 reference are added.

A close reading of the Carlin '654 pre-grant publication will reveal that it is not made for attachment to the end of capillary tubing. Rather, the disclosed injection probe assembly is an attachment on the end of a tool string (24). This distinction is made particularly apparent by contrasting the teaches of the Carlin '654 pre-grant publication with the other cited references.

The Canterbury '594 reference and the Gregston '611 reference are much closer to the teachings in the referenced application as they are directed to independent systems for the injection of small amounts of chemical into a well. Accordingly, the U.S. Patent and Trademark Office is correct that a system similar to the one disclosed in the instant application would require the use of a pump, a reservoir and a check valve configuration as shown in the Gregston

‘611 reference. However, the operation of the invention disclosed in the Gregston ‘611 reference is dramatically different than the operation of the probe assembly disclosed in the Carlin ‘654 pre-grant publication and the well service valve described in the Canterbury ‘594 reference. Specifically, the operation of the Gregston ‘611 reference is built around a free traveling piston that regularly cycles up and down within the well. This regular cycling is used to mechanically initiate the squirt of a chemical into the well. Neither the Carlin ‘654 pre-grant publication nor the Canterbury ‘594 reference teaches a free traveling piston or the regular squirt of a chemical. It is submitted therefore that the Gregston ‘611 reference is not properly combinable with the Carlin ‘654 pre-grant publication nor the Canterbury ‘594 reference to reject the pending claims.

A still closer look at the Carlin ‘654 pre-grant publication will reveal that the spring constant is not adjustable and, accordingly, does not provide adjustability to well conditions provided by the present invention. Further, because the Carlin ‘654 pre-grant publication teaches that the injected fluid exits the housing above the spring mechanism, there is no flow of injected fluid through the spring mechanism to keep it clean. The only protection for the spring mechanism is the O-ring seal (50).

In the present invention, no O-ring seals are needed as the lower fixed mechanical bias check valve serves as a trash valve and protects the upper part of the valve from any type of debris which could inhibit its operation.

A closer look at the Canterbury ‘594 reference will reveal that formation pressure is used to assist spring pressure. Further, the valve described in the Canterbury ‘594 reference is set below a packer to hold the hydrostatic pressure in the anulus away from where the valve

Application. No. 10/620,956
Amendment dated September 8, 2004
Reply to Office Action of June 9, 2004

operates. And, like the Gregston '611 reference, the injection of fluid or chemical is set to be above the spring mechanism.

Unlike the Canterbury '594 reference, the valve system disclosed in the instant application does not use formation pressure to assist the operation of the spring. Further, there is no need to set the valve below a packer, and further, the injection of fluid is below the operative adjustable bias in the first check valve.

These differences have now been added to the amended claims.

The Second Rejection Under 35 U.S.C. § 103 – Obviousness:

Claims 7 and 16 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Carlin '654 pre-grant publication in view of the Gregston '611 reference and the Canterbury '594 reference as applied to Claims 6 and 15 above and further in view of the U.S. Patent No. 4,393,928 to Warnock, Sr.

35 U.S.C. 132 Rationale:

In the opinion of the United States Patent and Trademark Office, the Carlin '654 pre-grant publication in view of the Gregston '611 references and Canterbury '594 references shows all the limitations of the claimed invention except the Carlin '654 pre-grant publication does not disclose that the seat of the ball and check valve are hardened. For this teaching, the United States Patent and Trademark Office has relied on Column 3, Lines 51-54 of the Warnock, Sr. '928 reference for the disclosure of a ball and seat check valve in which the seat (19) is made of hardened material. In the opinion of the United States Patent and Trademark Office, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a hardened seat as taught by the Warnock, Sr. '928 reference in the apparatus described in the

Application. No. 10/620,956
Amendment dated September 8, 2004
Reply to Office Action of June 9, 2004

Carlin '654 pre-grant publication in view of the Gregston '611 reference and the Canterbury '594 reference. The motivation for this combination would be to provide a more wear resistant valve.

Response to the Second Rejection:

As indicated in the prior response, the combination of the Carlin '654 pre-grant publication and the Gregston '611 reference with the Canterbury '594 reference is not well founded. Accordingly, since the Warnock, Sr. '628 reference is yet in addition to the previously stated improper combination, this rejection cannot stand and Claims 7 and 16 are in a condition for allowance.

Should the Examiner believe that the prosecution of this application may be advanced by a telephone conference, please call the undersigned at the number show below.

Respectfully submitted,

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Attachments